

WHAT IS CLAIMED IS:

1. A method for stabilizing a hygroscopic ingredient in a moist composition, said method comprising:

- (a) encapsulating said hygroscopic ingredient with a lipid coating in an amount sufficient to retain at least about 60 wt% of said hygroscopic ingredient after said encapsulated ingredient is combined with said moist composition for a time period of at least about 1 day; and
- (b) combining said encapsulated hygroscopic ingredient with said moist composition.

2. A method according to Claim 1, wherein said hygroscopic ingredient is choline chloride or lysine hydrochloride.

3. A method according to Claim 1, wherein said moist composition has a water activity of at least about 0.1.

4. A method according to Claim 3, wherein said moist composition has a water activity in the range of about 0.2 to about 0.9.

5. A method according to Claim 4, wherein said moist composition has a water activity in the range of about 0.3 to about 0.7.

6. A method according to Claim 1, wherein said moist composition is an animal feed.

7. A method according to Claim 1, wherein said encapsulated hygroscopic ingredient is in the form of particles comprising a core, which comprises said hygroscopic ingredient, and a lipid coating.

8. A method according to Claim 1, wherein said lipid coating consists essentially of hydrogenated vegetable oil, hydrogenated corn oil, hydrogenated cottonseed oil, hydrogenated peanut oil, hydrogenated palm kernel oil, hydrogenated sunflower oil and mixtures thereof.

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9. A method according to Claim 8, wherein said hydrogenated vegetable oil is hydrogenated soybean oil.

10. A method according to Claim 1, wherein said lipid coating is primarily hydrogenated vegetable oil mixed with lesser amounts of wax selected from the group consisting of beeswax, petroleum wax, rice bran wax, castor wax, microcrystalline wax, and mixtures thereof.

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11. A method according to Claim 10, wherein the wax is beeswax.

12. A method according to Claim 1, wherein said lipid coating further comprises one or more discrete additives which impact the release and/or stability and/or density of the encapsulate.

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13. A method according to Claim 12, wherein said discrete additives are selected from the group consisting of dicalcium phosphate, tricalcium phosphate, salts, iron, sodium aluminosilicate, chitosan, and combinations thereof.

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14. A method according to Claim 1, wherein said lipid coating further comprises a surfactant.

15. A method according to Claim 1, wherein said lipid coating is present in an amount sufficient to retain at least about 80 wt% of said hygroscopic ingredient.

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16. A method according to Claim 15, wherein said lipid coating is present in an amount sufficient to retain at least about 90 wt% of said hygroscopic ingredient.

17. A method according to Claim 16, wherein said lipid coating is present in an amount sufficient to retain at least about 95 wt% of said hygroscopic ingredient.

18. A method according to Claim 1, wherein said time period is at least about 1 week.

19. A method according to Claim 18, wherein said time period is in the range from about 1 week to about 8 weeks.

20. A method according to Claim 19, wherein said time period is in the range from about 2 weeks to about 4 weeks.

21. A method for controlled protection of a hygroscopic bioactive substance contained in a moist feed composition from the rumen portion of the digestive system of a ruminant, said method comprising:

(a) encapsulating said hygroscopic bioactive substance with a lipid coating in an amount sufficient to retain at least about 60 wt% of said hygroscopic bioactive substance after said encapsulated substance is combined with said feed for a time period of at least about 1 week and thereafter passes through the rumen portion of the digestive system of a ruminant;

(b) combining said encapsulated substance with said feed composition;

(c) retaining said combination of said encapsulated substance and feed composition for a time period of at least about 1 week; and

(d) feeding said combination of said feed composition and encapsulated substance to the ruminant.

22. A method according to Claim 21, wherein said environmentally sensitive substance is choline chloride or lysine hydrochloride.

23. A method according to Claim 21, wherein said feed composition has a water activity of at least about 0.1.

24. A method according to Claim 23, wherein said feed composition has a water activity in the range of about 0.2 to about 0.9.

25. A method according to Claim 24, wherein said feed composition has a water activity in the range of about 0.3 to about 0.7.

26. A method according to Claim 21, wherein said encapsulated hygroscopic bioactive substance is in the form of particles comprising a core, which comprises said hygroscopic bioactive substance, and a lipid coating.

27. A method according to Claim 21, wherein said lipid coating consists essentially of hydrogenated vegetable oil, hydrogenated corn oil, hydrogenated cottonseed oil, hydrogenated peanut oil, hydrogenated palm kernel oil, hydrogenated sunflower oil and mixtures thereof.

28. A method according to Claim 27, wherein said hydrogenated vegetable oil is hydrogenated soybean oil.

29. A method according to Claim 21, wherein said lipid coating is primarily hydrogenated vegetable oil mixed with lesser amounts of wax selected from the group consisting of beeswax, petroleum wax, rice bran wax, castor wax, microcrystalline wax, and mixtures thereof.

30. A method according to Claim 29, wherein said hydrogenated vegetable oil is hydrogenated soybean oil.

31. A method according to Claim 29, wherein the wax is beeswax.

32. A method according to Claim 21, wherein said lipid coating is present in an amount sufficient to retain at least about 80 wt% of said hygroscopic substance.

33. A method according to Claim 32, wherein said lipid coating is present in an amount sufficient to retain at least about 90 wt% of said hygroscopic substance.

34. A method according to Claim 21, wherein said time period is in the range from about 1 week to about 8 weeks.

35. A method according to Claim 34, wherein said designated time period is in the range from about 2 weeks to about 4 weeks.

36. A method according to Claim 21, wherein said encapsulating step is carried out by applying a continuous lipid coating to said bioactive substance in a one step process.

37. A method according to Claim 21, wherein said lipid coating further comprises one or more discrete additives which impact the release and/or stability and/or density of the encapsulate.

38. A method according to Claim 37, wherein said discrete additives are selected from the group consisting of dicalcium phosphate, tricalcium phosphate, salts, iron, sodium aluminosilicate, chitosan, and combinations thereof.

39. A method according to Claim 21, wherein said lipid coating further comprises a surfactant.

40. A composition containing a stabilized hygroscopic ingredient comprising:

- (a) a non-water sensitive moist material; and

(b) a hygroscopic ingredient stabilized with a controlled-protection lipid coating in an amount sufficient to retain at least about 60 wt% of said hygroscopic ingredient after a time period of at least about 1 day.

5 41. A composition according to Claim 40, wherein said non-water sensitive material has a water activity of at least about 0.1.

42. A composition according to Claim 41, wherein said non-water sensitive material has a water activity in the range of about 0.2 to about 0.9.

10 43. A composition according to Claim 42, wherein said non-water sensitive material has a water activity in the range of about 0.3 to about 0.7.

44. A composition according to Claim 40, wherein said non-water sensitive material is an animal feed.

15 45. A composition according to Claim 44, wherein said lipid coating is present in an amount sufficient to retain at least about 60 wt% of said hygroscopic ingredient after a time period of at least 1 day and after passing through the rumen portion of the digestive system of a ruminant following ingestion of said composition by said ruminant.

20 46. A composition according to Claim 40, wherein said environmentally sensitive ingredient is choline chloride or lysine hydrochloride.

25 47. A composition according to Claim 40, wherein said lipid coating consists essentially of hydrogenated vegetable oil, hydrogenated corn oil, hydrogenated cottonseed oil, hydrogenated peanut oil, hydrogenated palm kernel oil, hydrogenated sunflower oil and mixtures thereof.

30 48. A composition according to Claim 47, wherein said hydrogenated vegetable oil is hydrogenated soybean oil.

49. A composition according to Claim 40, wherein said lipid coating is primarily hydrogenated vegetable oil mixed with lesser amounts of wax selected from the group consisting of beeswax, petroleum wax, rice bran wax, castor wax, microcrystalline wax, and mixtures thereof.

50. A composition according to Claim 49, wherein said hydrogenated vegetable oil is hydrogenated soybean oil.

51. A composition according to Claim 49, wherein the wax is beeswax.

52. A composition according to Claim 40, wherein said lipid coating is present in an amount sufficient to retain at least about 80 wt% of said hygroscopic ingredient.

53. A composition according to Claim 52, wherein said lipid coating is present in an amount sufficient to retain at least about 90 wt% of said hygroscopic ingredient.

54. A composition according to Claim 53, wherein said lipid coating is present in an amount sufficient to retain at least about 95 wt% of said hygroscopic ingredient.

55. A composition according to Claim 40, wherein said time period is in the range from about 1 week to about 8 weeks.

56. A composition according to Claim 55, wherein said time period is in the range from about 2 weeks to about 4 weeks.

57. A composition according to Claim 40, wherein said lipid coating further comprises one or more discrete additives which impact the release and/or stability and/or density of the encapsulate.

58. A composition according to Claim 57, wherein said discrete additives are selected from the group consisting of dicalcium phosphate, tricalcium phosphate, salts, iron, sodium aluminosilicate, chitosan, and combinations thereof.

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59. A composition according to Claim 40, wherein said lipid coating further comprises a surfactant.